

CLAIMS

What is claimed is:

1. A printer for transferring images to media using a multi-color dye diffusion process, the printer comprising:  
5 a print station including a printhead and a platen for receiving sheets of receiver media fed therebetween from an input path;  
a first discharge path for translating imaged receiver media from the print station to an output tray; and  
a second discharge path for translating receiver media from the print station to a compartment separated from the output tray during intermediate passes of the dye diffusion process.  
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2. The printer of claim 1, the printer further comprising an output diverter which is movable to guide media sheets from the print station to said first discharge path when said output diverter is in a first position, and to guide media sheets from said print station to said compartment when said output diverter is in a second position.  
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3. A printer for use in transferring an image to a media sheet using a dye diffusion process or a direct thermal process, the printer comprising:  
20 a platen;  
a printhead assembly having a printhead and a point of rotation allowing said printhead to be rotated between a first printhead position in which said

printhead is proximate a media sheet in contact with said platen and a second  
printhead position in which said printhead is separated from said platen; and

a dye diffusion donor apparatus having a donor spool and a take-up spool  
for dispensing a donor ribbon between the printhead and said media sheet when  
said printhead is in said first printhead position during dye diffusion printing,

wherein said dye diffusion donor apparatus is movable such that said  
donor ribbon is not dispensed between said printhead assembly and said media  
sheet during direct thermal printing.

4. The printer according to claim 4, wherein said donor ribbon is placed against said  
printhead while said printhead is in said second printhead position and said donor  
ribbon is placed in contact with said media sheet when said printhead is rotated to  
said first printhead position.
5. The printer according to claim 4, wherein said take-up spool rotates about a fixed  
axis.
6. The printer according to claim 4, wherein said donor spool rotates about an axis  
that that is moveable between a first spool position and a second spool position,  
said donor ribbon being dispensed between the printhead and said media sheet  
when said donor spool is in said first spool position.

7. The printer according to claim 7, wherein said axis is fixed in said first spool position during said dye diffusion printing.
8. The printer according to claim 7, wherein said printhead assembly is between said first spool position and said second spool position when said printhead is in said first printhead position.
9. The printer according to claim 7, wherein said take-up spool is rotated to reduce the length of said donor ribbon between said donor spool and said take-up spool as said donor spool is moved from said first spool position to said second spool position
10. A printer for use in transferring an image to a media sheet using either a dye diffusion process or a direct thermal process, the printer comprising:  
a platen;  
a printhead assembly having a printhead and a point of rotation allowing said printhead to be rotated between a first printhead position in which said printhead is proximate a media sheet in contact with said platen and a second printhead position in which said printhead is separated from said platen; and  
a dye diffusion donor apparatus having a donor spool and a take-up spool for dispensing a donor ribbon between the printhead and said media sheet when said printhead is in said first printhead position during dye diffusion printing,

wherein one of said donor spool and said take-up spool is moveable between a first spool position and a second spool position, said donor ribbon being dispensed between said printhead and said media sheet when said one of said donor spool and said take-up spool is in said first position.

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11. A donor ribbon for use in multi-color dye diffusion printing, the donor ribbon comprising:

a plurality of color sections arranged in a pattern repeating along the length of said donor ribbon, wherein adjacent color sections transmit dye of different colors to a media sheet and said adjacent color sections are separated by a border;

a code portion extending the length of the donor ribbon, the code portion including optically readable information encoded thereon for identifying at least one of a lot number associated with said donor ribbon, the location of said border between two adjacent color sections and the color of dye associated with a color section.

12. The donor ribbon according to claim 12, wherein said donor ribbon has a side edge and said code portion is proximate said side edge.

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13. The donor ribbon according to claim 12, wherein said optically readable information is in the form of a barcode.

14. The donor ribbon according to claim 12, wherein each of said color sections transmits dye of a color selected from the group of cyan, magenta, yellow and black.
- 5 15. A picker assembly for translating media sheets from a media tray to a media input path, the picker assembly comprising:
- a drive shaft having an axis, a length, a center, a first end and a second end;
  - a compliant belt configured to rotate said drive shaft about said axis; and
  - a pair of picker tires attached to the drive shaft proximate said first and second ends thereof such that the picker tires are coaxial with the drive shaft, the picker tires being rotatable when a torque is applied to said drive shaft by said compliant belt,
- wherein the drive shaft is pivotable in a plane including the drive shaft axis about the center of the drive shaft to evenly distribute the load of the picker on the media sheets in the tray between the pair of picker tires.
16. The picker assembly according to claim 16, wherein said drive shaft includes a friction member adapted to receive said compliant belt;
- 20 17. The picker assembly according to claim 17, wherein said friction member is located proximate said center of said drive shaft.

18. The picker assembly according to claim 16, wherein said drive shaft includes a first shaft portion, a second shaft portion and a pivot bushing coupling said first shaft portion to said second shaft portion.
- 5 19. The picker assembly according to claim 19, wherein said pivot bushing is located proximate said center of said drive shaft.
20. The picker assembly according to claim 17, wherein said compliant belt rotates said drive shaft when said compliant belt is driven by a torque shaft.
21. A printer having a plurality of trays, each of said trays containing a stack of media sheets, said printer comprising:
- a motor configured to rotate a torque shaft; and
  - a picker assembly associated with each of said plurality of trays, each of said picker assemblies including:
    - a drive shaft having an axis, a length, a center, a first end and a second end;
    - a compliant belt configured to rotate said drive shaft about said axis in response to rotation of said torque shaft by said motor; and
    - 20 a pair of picker tires attached to the drive shaft proximate said first and second ends thereof such that the picker tires are coaxial with the drive shaft, the picker tires being rotatable when a torque is applied to said drive shaft by said compliant belt, wherein

a top sheet of the stack of media sheets contained in one of said plurality of trays is dispensed from said tray by moving the picker assembly associated with said one of said plurality of trays to a lowered position in which said pair of picker tires is placed in contact with said top sheet of said stack of media sheets and said pair of picker tires is rotated by rotating said torque shaft.

22. The printer according to claim 22, wherein said picker assembly is moved by pivoting said picker assembly about a fixed axis.
23. The printer according to claim 23, wherein the picker assembly associated with said one of said plurality of trays from which said top sheet is being dispensed is in the lowered position, and further wherein the picker assemblies associated with the remaining ones of said plurality of trays are in a raised position in which said pairs of picker tires associated with the picker assemblies in the raised position are not in contact with said stacks of media sheets contained in said remaining ones of said plurality of trays.
24. A system for dispensing media sheets to an input path of a printer, the system comprising:
- a plurality of media trays, each media tray having a plurality of media sheets stacked therein including a top media sheet;
- for each of the media trays, a picker assembly having a pair of picker tires adapted for applying a lateral force to the top media sheet when in contact with

the top media sheet for translating the top media sheet into a printing path in response to a torque;

a motor for simultaneously applying a torque to each of the picker assemblies through a single source of torque; and

5 a mechanism for selectively dispensing the top media sheet from a selected one of the media trays by lowering the picker tires of the picker assembly associated with the selected media tray to the top media sheet of the selected media tray while maintaining a separation between the picker tires of the unselected media trays and the top media sheets of the unselected media trays.

25. The system of claim 25, wherein the picker assemblies receive torque from the single source of torque independent of a clutch.

26. A printhead assembly for transferring images to a media sheet translated over a platen:

a printhead having a length, said printhead having a plurality of thermal elements arranged linearly along said length of the printhead for application to the media sheets during printing;

20 a printhead support assembly coupled at a first end to the printhead for positioning the thermal elements to transfer images to said media sheet when said media sheet is translated over said platen, the printhead support assembly being coupled at a second end to a torque member; and



a coupling between said printhead and said first end of said printhead support assembly adapted to allow movement of said printhead relative to the torque member to uniformly distribute a load associated with said printhead against said media sheet and said platen along said length of said printhead.

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27. A printer for transferring images to a sheet of media, the printer comprising:
- a housing including at least one vent formed therein;
  - a print station including a thermal printhead and a platen for transferring images to media sheets fed therethrough, said thermal printhead having a printing surface that is placed in contact with said sheet of media during printing and a second surface;
  - a heat sink coupled to said second surface of said thermal printhead for removing heat from said thermal printhead; and
  - a ventilation channel coupled between the at least one vent and the heat sink to transport air from outside of the printer housing to the heat sink while preventing said air from reaching the print station.

28. A printer for transferring images to media sheets, the printer comprising:

- a printing station including a printhead and a platen for transferring images to media sheets translated therebetween;
- a motor for providing a single source of torque;

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a capstan and pinch roller combination adapted for receiving media sheets and translating the media sheets past the print station in response to a first torque transferred to the capstan from the single source of torque at the motor;

at least one output tray for collecting media sheets translated past the print station by the capstan and pinch roller combination; and

a roller adapted for translating media sheets from the capstan and pinch roller combination to the at least one output tray in response to a second torque transferred to the roller from the single source of torque at the motor.

29. A printer for transferring images to media sheets, the printer comprising:

a print station including a printhead and a platen for receiving media sheets therebetween; and

a capstan roller and pinch roller combination for receiving the media sheets therebetween for translating the media sheets away from the print station in response to a torque applied to the capstan roller,

wherein the capstan roller is rigid and the pinch roller is deformable to maintain the media sheets in contact with the surface area of the capstan roller so that the surface speed of the media sheet is substantially the same as the surface speed of the capstan roller while being translated away from the print station.

30. A printer for transferring images to media sheets, the printer comprising:

at least one media tray containing a stack of media sheets, said stack including a top sheet, wherein said stack rests on a bottom surface of said media tray;

5 a picker assembly for applying a lateral force to the top sheet to dispense said top sheet from said media tray;

a light source; and

an optical sensor for detecting when all of said media sheets in said stack have been dispensed from said media tray.

31. The printer according to claim 32, wherein light from said light source is reflected from said top sheet when said media tray contains said stack, and further wherein light from said light source is reflected from said bottom surface when all of said media sheets in said stack have been dispensed, and further wherein said optical sensor is configured to compare the determine whether all of the media sheets in said stack have been dispensed based on the difference between the reflective properties of the top sheet and the bottom surface.

32. The printer according to claim 32, wherein said bottom surface is non-reflective.

20 33. The printer according to claim 32, wherein said optical sensor is located within said bottom surface.

34. A printer for transferring images to media using a dye diffusion processes, the printer comprising:

a print station including a printhead and a platen for receiving a media sheet translated through an input path;

a capstan;

a pinch roller, the combination of said capstan and said pinch roller configured to translate said media sheet through said input path in a forward direction and a reverse direction between intermediate color passes during dye diffusion printing;

a plurality of media trays for dispensing said media sheet from among a plurality of media sheets to the print station through the input path; and

at least one guide member having a first surface for guiding a leading edge of said media sheet from one of said plurality of media trays into the input path and a second surface for preventing a trailing edge of said media sheet from entering one of the plurality of media trays when said media sheet is translated in the reverse direction.

35. The printer according to claim 35, wherein said media sheet is dispensed from one of the plurality of media trays to the print station through the input path without the use of an intermediate roller.

36. The printer according to claim 35, said printer including a hide tray configured to receive said media sheet from said print station when said media sheet is

translated through said input path in the forward direction during an intermediate color pass.

37. A printer for transferring images to a media sheet, said media sheet having a leading edge and a trailing edge, the printer comprising:
- a print station including a printhead and a platen for receiving media sheets translated through an input path;
  - a plurality of media trays for dispensing said media sheet from among a plurality of media sheets to said print station through said input path; and
  - a guide member having a convex surface with respect to the platen for pushing the trailing edge of each media sheet toward the platen as the media sheet translates through the print station, the convex surface dampening vibrations at the trailing edge to reduce image artifacts.
38. A printer for transferring images to media sheets using a direct thermal process, each media sheet having a leading edge and a trailing edge, the printer comprising:
- a print station including a printhead and a platen for receiving media sheets translated through an input path, the printhead thermally transferring images to the media sheets leaving an unprinted border on at least the trailing edge of the media sheets; and

a capstan and pinch roller combination for translating the media sheets in a forward direction through the print station in response to a torque applied to the capstan,

wherein the platen roller, in response to a torque applied thereto, translates media sheets in a reverse direction opposite the forward direction while the printhead blackens the border at the trailing edge.

39. A printer for transferring images to media sheets using a direct thermal process, each media sheet having a leading edge and a trailing edge, the printer comprising:

a print station including a printhead and a platen for receiving media sheets translated through an input path, the printhead thermally transferring images to the media sheets leaving an unprinted border on at least the leading edge of the media sheets; and

a capstan and pinch roller combination for translating the media sheets in a forward direction through the print station in response to a torque applied to the capstan,

wherein the platen roller, in response to a torque applied thereto, translates media sheets in the forward direction while the printhead blackens the border at the leading edge.

40. A printer for transferring images to media sheets, each media sheet having first and second side edges, the printer comprising:

a print station including a printhead and a platen for receiving media sheets translated through an input path;

a capstan and pinch roller combination for translating the media sheets through the print station to an output path; and

5 a sensor in the output path positioned to detect one of the first and second side edges of a media sheet while said media sheet is being translated through the output path, said sensor producing output indicating a lateral alignment of the media sheet relative to the printhead.

41. The printer according to claim 41, said printer including a light source positioned in the output path for transmitting light energy to the sensor and the sensor includes a plurality of light sensitive elements, the printer further including a printer controller for determining a lateral alignment of the media sheet in the output path relative to the printhead based upon light energy from the light source received at the light sensitive elements while the media sheet is translated over the sensor.

42. The printer according to claim 42, wherein the printer is capable of direct thermal printing, wherein the printhead thermally transfers images to the media sheet within a borders on at least one of the first and second side edges, and wherein the printer controller controls the printhead to blacken the border while maintaining the image transferred to the media sheet based upon the detected lateral alignment of the media sheet.

43. The printer according to claim 42, wherein the light source transmits a polarized light and the light sensitive elements include circuitry adapted to detect a difference in the phase of light received thereon.

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44. A printer for transferring images to a media sheet, said media sheet having a leading edge and a trailing edge, the printer comprising:

a print station including a printhead and a platen for receiving said media sheet translated through an input path, the printhead thermally transferring images to the media sheets and leaving an unprinted border on at least the trailing edge of the media sheets;

a capstan and pinch roller combination for translating said media sheet from the print station through an output path; and

a sensor in the output path at a known distance from the printhead for detecting the leading edge of the media sheets when translated in the output path.

45. The printer according to claim 45, the printer further including a light source for transmitting polarized light across the output path and to the sensor and wherein the sensor includes a plurality of light sensitive elements for receiving polarized light and circuitry for detecting a difference in the phase of light received by said light sensitive elements.

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46. A method of aligning a media sheet in a print station of a printer, the print station including a platen and a printhead, the printer further including a capstan and pinch roller combination, the printer having an input path for translating media sheets to the print station, the method comprising:

5           placing the printhead in a print position in which the platen applies a force to the printhead, the printhead and the platen forming a nip at a point of contact facing the input path;

          dispensing the media sheet to the print station through the input path such that a leading edge of the media sheet is fixed in the nip and aligned with the printhead;

          placing the printhead in a load position by reducing the force of the printhead against the platen; and

          rotating the platen to translate the media sheet to the pinch and capstan rollers.

47. A method of aligning a media sheet in a print station of a printer, the print station including a platen and a printhead, the printer further including at least one media tray for dispensing media sheets to the print station, the method comprising:

          placing the print station in a first position in which the printhead is  
20           applying a force against the platen at a point of contact;

          dispensing the media sheet from the media tray to the print station through an input path such that a leading edge of the media sheet meets the point of contact between the platen and the printhead;

calibrating the position of the media sheet when the leading edge meets  
the point of contact;

decreasing the force applied by the printhead against the platen at the point  
of contact; and

5 rotating the platen to translate the media sheet through the print station.

48. A printer for transferring images to media sheets, the printer comprising:

a platen;

a printhead assembly including a printhead secured to a printhead support  
member, said printhead support member having a point of rotation at a radial  
distance from the printhead; and

a torsion arm configured to apply a torque to the printhead support  
member such that a force is applied to said platen through said printhead when  
said printhead and said platen are in contact,

wherein the torque applied by the torsion arm is controllable by a printer  
controller to maintain the force applied to the platen at a first force which is  
suitable for printing using a dye diffusion technique or a second force which is  
suitable for printing using a direct thermal transfer technique.

20 49. A printer for transferring images to media sheets, the printer comprising:

a print station including a printhead and a platen roller, the printhead  
including a print bead for applying a force on the platen at a point of contact when  
transferring an image to a media sheet;

a media tray for holding a stack of media sheets, the stack of media sheets including a top sheet having a leading edge, to be dispensed through an input path to the print station, the input path having a distance between the leading edge of the top sheet in the media tray to the point of contact on the platen;

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a torque source;

a picker assembly including at least one picker roller for rotating in response to receipt of a torque from the torque source to translate the top sheet into the input path when engaged with the top sheet; and

a printer controller for controlling the torque source to rotate the picker roller until the leading edge meets the point of contact and disengaging the picker roller from the top sheet when the leading edge meets the point of contact.

50. A method for controlling power applied to a printhead in a printer, the printer including a plurality of media trays, each of the media trays holding a stack of media sheets of a uniform media type, at least two of the media trays having media sheets of distinct media types, the printhead including linearly arranged thermal elements with an imaging surface for applying heat to media sheets while transferring an image thereto, the method comprising:

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identifying the media types of each of the media trays and associating a sub-imaging temperature with each of the identified types;

applying energy to each of the thermal elements to maintain the imaging surface of the thermal element to at least the minimum sub-imaging temperature associated with the types of media sheets in the media trays.

51. A printer for transferring images to media, the printer comprising:
- an enclosure including at least one external vent;
- a print station including a printhead and platen, the printhead having a  
linear array of thermal elements, each of the thermal elements having an imaging  
surface, adapted for applying a force to the platen at the imaging surfaces during  
imaging and having a heat sink thermally coupled to the array of thermal  
elements;
- a vent channel being fixedly attached to the external vent and being  
coupled between the heat sink and the external vent to permit air to circulate from  
external of the enclosure to the heat sink; and
- a flexible coupling between the vent channel and the heat sink permitting  
movement of the printhead such that the force applied to the platen during  
printing is substantially uniform over the array of thermal elements.
52. A printer for transferring an image to a media sheet, the printer comprising:
- a plurality of media trays, each of the media trays holding a stack of media  
sheets of a uniform media type, at least two of the media trays having a plurality  
of media sheets of distinct media types;
- a printhead including thermal elements for transferring an image to a  
media sheet dispensed from a selected one of the media trays;
- a sensor for providing data representative of an actual image density  
associated with a portion of the actual image transferred to the media sheet; and

a printer controller for adjusting power signals applied to the thermal elements based upon data representative of desired image density at pixel locations in a desired image and data provided by said sensor.

53. The printer according to claim 53, wherein the printer controller further adjusts the power signals applied to the thermal elements based upon the data representative of the media type associated with the media sheet.
54. A printer for transferring an image to a media sheet, the printer comprising:
- a print controller;
  - a plurality of media trays, each of the media trays holding a stack of media sheets of a uniform media type, at least two of the media trays having a plurality of media sheets of distinct media types;
  - a marking associated with each of said media trays, said marking containing readable information indicating one of the size, the type, the opacity, the thermal characteristics and the lot number of said stack of media sheets associated with said media tray; and
  - an optical sensor for reading said marking and transmitting data related to said readable information to said processor.
55. The printer according to claim 55, said printer further including a picker assembly associated with each of said plurality of media trays, wherein said processor selects a media tray based upon said data transmitted by said optical sensor and

said processor causes said picker assembly associated with said selected media tray to dispense a media sheet from said selected media tray.

56. The printer according to claim 55, wherein said marking is a label imprinted with a barcode.

57. A printer for transferring images to media, the printer comprising:

- a print engine for transferring images to media in response to control signals;
- a printer controller for providing the control signals to the print engine based upon image data;
- a first non-volatile memory storing printer system data accessible by processes executing at the printer controller, the printer system data including data representative of Postscript keys, gamma correction settings and a network address associated with the printer; and
- a second non-volatile memory for storing a copy of the printer system data, the second non-volatile memory being detachably coupled to the printer and capable of being coupled to a second printer for downloading the printer system data to the second printer.

58. A thermal printhead for application to heat responsive media for transferring images thereto, the printhead comprising:

an array of thermal elements formed in a line adapted for receiving power;  
and

a ceramic bead formed over the array of thermal elements,

wherein each thermal element includes a pair of resistive elements coupled  
in series to receive a power signal and positioned along the line forming the array  
of thermal elements.

59. A printhead for use in either a dye diffusion or direct thermal printing process, the  
printhead comprising:

an array of resistive elements; and

an imaging surface formed over each of the resistive elements having a  
printhead geometry that includes a rounded portion and a flat portion.